

12th Process Plant Safety Symposium 2010

**Topical Conference at the 2010 AIChE Spring Meeting
and 6th Global Congress on Process Safety**

**San Antonio, Texas, USA
21 – 25 March 2010**

ISBN: 978-1-61738-434-9

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2010) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact AIChE
at the address below.

AIChE
3 Park Avenue
New York, NY 10016-5991

Phone: (203) 702-7660
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Managing Management of Change	1
<i>Jack Chosnek</i>	
Are You Tired of Playing "Whack a Mole" with Your Process Safety Management Program Results - If So, Its Time for a Change	13
<i>David E. Cummings</i>	
Training Management of Change Approvers	25
<i>Karen Study</i>	
LOPA and Human Reliability – Human Errors and Human IPLs	32
<i>Bill Bridges</i>	
Use and Misuse of Enabling Conditions and Conditional Modifiers in Layers of Protection Analysis	58
<i>J. Wayne Chastain</i>	
Is It Really An Independent Protection Layer?	80
<i>Arthur M. Dowell III</i>	
Consistent Consequence Severity Estimation	91
<i>Angela E. Summers, Bill Vogtmann, Steve Smolen</i>	
Instrumented Protective Systems for Distillation Operations	107
<i>Jennifer Mize, J. Wayne Chastain</i>	
Using the ISA84 / HAZOP / LOPA Process to Design a Safety Instrumented System (SIS) for a Fumed Silica Burner	127
<i>Jeffrey O. Mudd, Bryan E. Pierce, Bruce K. Vaughen</i>	
Implementing An Effective Conduct of Operations and Operational Discipline Program	138
<i>James A. Klein, William Bradshaw, Lee Vanden Heuval, Donald K. Lorenzo, Gregory Keeports</i>	
Process Safety in the Face of Significant Change	154
<i>Leslie J. May, Don J. Pomraning</i>	
How to Evaluate Process Safety Culture	167
<i>Jerry Forest</i>	
Using Root Cause Failure Analysis Results to Estimate Failure Rates and PFDavg for Spring Operated Pressure Relief Valves	197
<i>Julia V. Bukowski, William M. Goble</i>	
Results of Root Cause Analyses of Spring Operated Pressure Relief Valve Failures	212
<i>Julia V. Bukowski, Robert E. Gross</i>	
Use of Multiply Non-Destructive Examination (NDE) Methods in Life-Cycle Evaluation of Process Equipment and Systems	227
<i>F. Russ Davis, Shane Ardoin</i>	
Risk-Based Mechanical Integrity - Beyond Fixed Equipment	239
<i>Thomas J. Folk</i>	
Adjusting Spring Operated Pressure Relief Valve Proof Test Intervals Using Statistical Modeling, and Comparing the Resulting Financial Risk	259
<i>Stephen P. Harris, Robert E. Gross</i>	
Strategies & Tactics for Mechanical Integrity Budget Battles	272
<i>Daniel A. Long, Jack McCavit</i>	
Understanding Data Requirements	285
<i>H. W. Thomas</i>	
Semi-Automated Work Process for Capturing Relief Valve Proof Test Data to Support Failure Rate Analysis	293
<i>H. W. Thomas, Todd Horner, Jared Gladney, Bob Matthews</i>	
Preventing Loss of Containment through a Systematic Assessment of Hazards, Consequences, and Risks	300
<i>Seshu Dharmavaram, James A. Klein</i>	
Improving Operational Discipline to Help Prevent Loss of Containment Incidents	318
<i>Bruce K. Vaughen, James Klein</i>	
A Decade of Loss of Containment Lessons – Incident Investigations by the US Chemical Safety Board	340
<i>Marc G. Sáenz</i>	
Improved Flange Joint Reliability Can Help Prevent Loss of Containment	341
<i>Tom Sandbrook, John Ludman, Mike Emery</i>	
The Hazards of Thermal Expansion	354
<i>Juan C. Ramirez, Russell Ogle, Andrew Carpenter, Delmar Morrison III</i>	

Using Real Time Process Models to Detect Loss of Containment and Mitigate Hazards	366
<i>Harri K. Kytömaa, Timothy J. Myers, Alfonso F. Ibarreta, Nicolas Ponchaut</i>	
Lessons Learned From Real World Application of the Bow-Tie Method	380
<i>Steve Lewis, Kris Smith</i>	
High Integrity Protective System Design Using A Risk Based Approach	400
<i>Robert J. Stack</i>	
Utilizing Integrated Risk Assessment to Maximize Asset Integrity Management	413
<i>Ramanathan Bharathi Theertha Viswanathan, Steve Soos Sr.</i>	
Successful Process Safety Management Requires a Barrier Risk Assessment Tool	431
<i>Ronald G. Hallmark</i>	
Optimizing Facility Siting and Layout through Mapping Risk Estimates On Plant Area and Monetizing	442
<i>Seungho Jung, Dedy Ng, Carl Larid, Sam M. Mannan</i>	
EVALUATION of Normative Barriers through the Mads/Mosar Methodology	454
<i>Laurent Perrin, Felipe Muñoz, André Laurent</i>	
OSHA Refinery and Chemical NEP Findings	475
<i>Lisa Long, James Lay, Mike Marshall</i>	
Preparing for the Chemical NEP	486
<i>Mark S. Dreux</i>	
Complying with OSHA's RNEP, CNEP, and VPP RAGAGEP	487
<i>Chad Patschke</i>	
Its Coming Right for Us! What to Expect and How to Prepare for the Chemical NEP	499
<i>David A. Moore, Mark L. Farley</i>	
Challenges in Hosting An NEP Inspection	507
<i>Ken Hanchey, James R. Thompson</i>	
OSHA Chemical NEP Panel Discussion	514
<i>Mark S. Dreux, Lisa Long, David A. Moore, Mark L. Farley, Ken Hanchey, Chad Patschke</i>	
Author Index	